THE WEATHER OF THE MONTH.

By W. B. STOCKMAN, Forecast Official, in charge of Division of Records and Meteorological Data.

CHARACTERISTICS OF THE WEATHER FOR JUNE.

A normal amount of sunshine obtained in the Middle Atlantic States, a slight deficiency in the Florida Peninsula, and marked deficiencies, ranging from 0.5 to 1.6 in the South Atlantic and Gulf States, the Plateau, southern slope, and Pacific coast regions; elsewhere it was above the normal in values ranging from 0.2 in the Ohio Valley and Tennessee to 1.2 in the middle slope region.

In the Atlantic, Gulf, and Pacific States, the southern slope, and southern and middle Plateau regions the relative humidity was below the normal from 2 to 10 per cent; elsewhere it was above the normal from 1 to 7 per cent, except in the northern Plateau region where it was normal.

In the South Atlantic and west Gulf States, North Dakota, the Plateau and northern and southern slope regions, and the Pacific coast districts there was a deficiency in precipitation ranging generally from 0.1 inch in the south Pacific district, to 2.6 inches in the southern slope region; in the east Gulf States the departure amounted to 4.2 inches; elsewhere the precipitation was in excess of the normal in values from 0.4 inch in the middle slope region to 2.5 inches in the lower Lake region. Since January 1, 1902, the accumulated deficiencies amounted to from 5.0 to 7.4 inches in the Ohio Valley and Tennessee and the Gulf and South Atlantic States, while the greatest accumulated excess is but 2.7 inches in the north Pacific region.

In the South Atlantic and Gulf States, the southern slope and southern and middle Plateau regions, and the middle and south Pacific coast districts the temperature was above the normal in values ranging from 0.4° in the South Atlantic States to 2.5° in the east Gulf States; in all other districts it was below normal, and, as a rule, the departures were greater than where excesses obtained, ranging from 2.0° to over 5.0° in New England, the northern slope, Missouri Valley, upper Mississippi Valley, the Lake region, and North Dakota. The only districts showing a very decided accumulated departure since January 1, 1902, are the upper Lake region, the northern slope, and North Dakota, where the average daily excess ranged from 2.0° to 2.8°. In the districts where accumulated deficiences obtained the values were not so great, the highest being 1.4° in the South Atlantic States.

The highest mean pressure obtained over the north Pacific and northern part of the middle Pacific districts. Another area of relatively high mean pressure overlay the Virginias and eastern Kentucky southward to southern Florida and the Gulf of Mexico.

PRESSURE.

The distribution of monthly mean pressure is shown graphically on Chart IV and the numerical values are given in Tables I and VI.

The highest mean pressure, 30.00 inches or slightly higher, obtained over the north Pacific and the northern part of the middle Pacific regions, in which area the departures for the month were slightly deficient. From the Virginias and eastern Kentucky southward to the Gulf of Mexico and the extreme southern part of Florida another area of relatively high pressure, 29.95 to 29.97 inches, obtained, with departures from the normal for the month of —0.04 to —0.06 inch.

The region of lowest pressure overlay southern Arizona and southwestern New Mexico, with mean readings of somewhat less than 29.70 inches, and departures from the normal for the month of from —0.05 to —0.08 inch.

The only region where the pressure was above the normal was from northern and south-central Nebraska northward over the Dakotas and northwestward over Montana, northern Idaho and northeastern Washington, with values not exceeding +0.06 inch. In northern New England, northeastern New York, extreme northwestern Texas, and northern New Mexico the departures were greatest and ranged from —0.10 to —0.13 inch. In northeastern Colorado, Wyoming, Nebraska, except the extreme eastern and southeastern parts, South Dakota, western North Dakota, Montana, central and northern Idaho, Washington, and northern Oregon, the pressure increased over that of May, 1902, from 0.01 to 0.11 inch; elsewhere it diminished, and generally with marked changes—in the Middle Atlantic and New England States, lower Lake region, upper Lake region, except about southern Lake Michigan, and in central California, the decrease amounted to 0.10 to 0.14 inch.

TEMPERATURE OF THE AIR.

The distribution of monthly mean surface temperature, as deduced from the records of about 1,000 stations, is shown on Chart VI.

The average temperature for the several geographic districts and the departures from the normal values are shown in the following table:

Average temperatures and departures from normal.

Districts.	Number of stations.	Average temperatures for the current month.	Departures for the current month.	Accumulated departures since January 1.	Average departures since January 1.
		°	°	°	°
New England	8	60.6	—2.3	+ 6.1	+1.0
Middle Atlantic	12	69.0	—1.9	— 2.7	—0.4
South Atlantic	10	77.6	+0.4	— 8.3	—1.4
Florida Peninsula	8	80.7	+1.0	— 5.0	—0.8
East Gulf	9	81.3	+2.5	— 4.1	—0.7
West Gulf	7	81.2	+2.1	+ 2.9	+0.5
Ohio Valley and Tennessee	11	72.7	—1.3	— 6.9	—1.2
Lower Lake	8	63.0	—4.1	— 0.8	—0.1
Upper Lake	10	58.3	—4.0	+11.7	+2.0
North Dakota	8	59.1	—5.4	+16.7	+2.8
Upper Mississippi Valley	11	67.9	—3.3	+ 4.3	+0.7
Missouri Valley	11	67.0	—3.6	+ 8.7	+1.4
Northern Slope	7	60.9	—2.1	+12.8	+2.1
Middle Slope	6	71.2	—0.4	+ 8.2	+1.4
Southern Slope	6	78.1	+1.9	+ 7.6	+1.3
Southern Plateau	13	74.3	+1.1	+ 1.7	+0.3
Middle Plateau	9	65.6	+1.6	+ 6.5	+1.1
Northern Plateau	12	60.6	—0.3	+ 6.5	+1.1
North Pacific	7	58.1	—0.1	+ 2.4	+0.4
Middle Pacific	5	62.3	+0.5	— 2.1	—0.4
South Pacific	4	67.3	+0.8	— 1.4	—0.2

In the South Atlantic and Gulf States and the middle and southern parts of the slope, Plateau, and Pacific regions the temperature was above the normal, the value amounting to 4.5° in southwestern Texas; elsewhere it was below the normal, and generally the departures were greater than in the region where it was above.

Maximum temperatures of 80° or higher everywhere occurred, except about Lake Superior, the Strait of Mackinac, and on the immediate coasts of the north Pacific and northern part of the middle Pacific regions; of 90° or higher in New England, New York, northern Pennsylvania, eastern West Virginia, northeastern Ohio, the upper Lake region, except about extreme southern Lake Michigan, extreme northern Illinois, northeastern Iowa, Wisconsin, and Minnesota, generally, northern North Dakota, Montana, except the southeastern part, Wyoming, except the extreme western part, extreme northern Idaho, Washington, western Oregon, and extreme northwestern California; 100° or higher generally in the interior of the Carolinas, Georgia, the east Gulf States and

Louisiana, Texas, except the extreme southeastern part, southwestern Colorado, southeastern Utah, New Mexico, Arizona, southern California, and the interior of central California; 110° or higher in north-central Texas, western Arizona, and southeastern California, and 120° to 127° in extreme southeastern California and parts of extreme southwestern Arizona.

Freezing temperatures occurred in scattered localities in New Hampshire and northeastern New York, southeastern North Dakota, South Dakota generally, western Montana, Wyoming, northwestern Colorado, southern Idaho, west-central Utah, northern Nevada, northeastern California, and parts of the interior of Washington.

In Canada.—Prof. R. F. Stupart says:

Vancouver Island is the only part of the Dominion where the mean temperature for June was as high as the average. In the Northwest Territories and Manitoba the negative departures ranged between 5° and 8°, and in Ontario, Quebec, and the Maritime Provinces between 2° and 5°. A negative departure of about 5° in Alberta diminished westward to 3° at Kamloops, and to nil at the Strait of Georgia, and a slight positive departure occurred at Victoria.

PRECIPITATION.

Precipitation in amounts from 10.0 inches to 13.9 inches occurred in west-central Indiana, north-central Illinois, central and extreme southwestern Iowa, southeastern Kansas, and parts of southeastern Texas; and 15.0 inches in the interior of north-central Florida. No precipitation was reported from parts of southeastern California, western Arizona, west-central and southern Nevada, and the central Rio Grande Valley.

Average precipitation and departure from the normal.

Districts.	Number of stations.	Average.		Departure.	
		Current month.	Percentage of normal.	Current month.	Accumulated since Jan. 1.
		Inches.		*Inches.*	*Inches.*
New England	8	3.94	134	+1.0	+0.2
Middle Atlantic	12	4.56	124	+0.9	−1.6
South Atlantic	10	3.13	63	−1.8	−7.4
Florida Peninsula	8	7.56	107	+0.5	−1.1
East Gulf	9	1.11	21	−4.2	−7.0
West Gulf	7	3.62	95	−0.2	−6.3
Ohio Valley and Tennessee	11	5.30	123	+1.0	−5.0
Lower Lake	8	6.10	169	+2.5	−1.0
Upper Lake	10	4.04	107	+0.3	−1.9
North Dakota	8	3.36	89	−0.4	+1.5
Upper Mississippi Valley	11	5.74	126	+1.2	−0.7
Missouri Valley	11	5.36	123	+1.0	−2.3
Northern Slope	7	2.20	85	−0.4	+0.2
Middle Slope	6	3.42	114	+0.4	+1.6
Southern Slope	6	0.84	24	−2.6	+1.4
Southern Plateau	13	0.10	25	−0.3	−1.4
Middle Plateau	8	0.19	32	−0.4	−1.1
Northern Plateau	12	0.67	46	−0.8	−1.0
North Pacific	7	1.67	74	−0.6	+2.7
Middle Pacific	5	0.06	13	−0.4	+1.5
South Pacific	4	T.	0	−0.1	−0.6

The precipitation was above the normal in New England, generally, the Middle Atlantic States, Virginia, except the southeastern part, northwestern South Carolina, north-central and extreme southern Florida, eastern and extreme southwestern Tennessee, West Virginia, Kentucky, Ohio, Indiana, lower Michigan, Illinois, except the extreme southern part, northern Arkansas, northeastern Oklahoma, eastern Kansas, Missouri, Iowa, southern Wisconsin, central South Dakota, eastern Nebraska, parts of central Colorado and southwestern Idaho, northwestern North Dakota, and northeastern Montana, the excess amounting to from 4.0 to 6.0 inches in northeastern and central Ohio, central Illinois, southwestern Missouri, southeastern Nebraska, and the extreme southern part of Florida; elsewhere it was below the normal, the deficiencies in the Gulf States and on the south Atlantic coast amounting to from 2.0 to 6.0 inches.

HAIL.

The following are the dates on which hail fell in the respective States:

Alabama, 3, 18, 20, 28. Arizona, 11. Arkansas, 3, 18, 19, 20, 21. California, 1, 10. Colorado, 4, 5, 11, 12, 13, 14, 15, 16, 26, 27, 28, 29, 30. Connecticut, 3. Delaware, 23, 26. Florida, 18, 20, 22. Georgia, 7, 8, 9, 14, 16, 22. Idaho, 1, 4, 5, 25, 26, 30. Illinois, 2, 3, 4, 9, 10, 11, 12, 13, 15, 25, 26, 28. Indiana, 1, 6, 7, 11, 13, 15, 25, 26, 27. Iowa, 1, 2, 3, 4, 5, 6, 10, 11, 12, 13, 15, 18, 24, 25. Kansas, 6, 19, 20. Kentucky, 3, 7, 13, 15, 18, 25, 26, 27, 28, 30. Louisiana, 9, 11, 18, 19, 20, 21, 28. Maine, 24, 25. Maryland, 3, 13, 25, 29. Massachusetts, 3. Michigan, 12, 15, 22, 23, 24, 25, 28. Minnesota, 1, 2, 7, 8, 9, 14, 20, 21. Mississippi, 17, 18, 19, 20, 27. Missouri, 15, 18, 28. Montana, 1, 3, 4, 8, 14, 15, 16, 17, 18, 24, 25, 26, 29, 30. Nebraska, 1, 4, 5, 6, 7, 10, 11, 12, 13, 14, 16, 19, 23, 24, 26, 27, 28, 30. Nevada, 1. New Hampshire, 3, 4, 5. New Jersey, 7, 13, 14, 23, 24. New Mexico, 3, 4, 6, 10, 11, 16. New York, 2, 3, 7, 14, 15, 16, 17, 21, 23, 24, 26. North Carolina, 6, 8, 11, 12, 21. North Dakota, 1, 5, 10, 24. Ohio, 6, 7, 8, 12, 13, 14, 15, 18, 22, 23, 24, 25, 26, 28. Oklahoma, 13, 14, 15. Pennsylvania, 3, 12, 13, 16, 21, 23, 24. Rhode Island, 4. South Carolina, 4, 8, 21, 26. South Dakota, 5, 6, 12, 14, 21, 24, 30. Tennessee, 1, 5, 7, 8, 12, 13, 18, 21, 26. Texas, 2, 6, 12, 28, 29, 30. Utah, 1, 28. Vermont, 5, 24. Virginia, 12, 13, 21, 28, 30. Washington, 3, 4, 14. West Virginia, 12, 18, 19, 23, 25, 26. Wisconsin, 2, 12, 21. Wyoming, 1, 13, 15, 27, 28.

SLEET.

The following are the dates on which sleet fell in the respective States:

Idaho, 1. Minnesota, 20, 21. North Dakota, 19, 20. Ohio, 23.

In Canada.—Professor Stupart says:

In nearly all parts of the Dominion the June rainfall was in excess of the average; in Quebec, northern New Brunswick, and Manitoba it was from one-third greater to double the average, and the same is true over a large portion of Ontario. In the more central parts of Alberta, as in May, the rainfall has been phenomenal. Calgary reporting four times the average amount; this extreme excess did not, however, extend north of Wetaskiwin, and in the neighborhood of Edmonton there was even a small deficiency. In the upper mainland of British Columbia there was an excess, but in the lower mainland a deficiency, which was even more pronounced in Vancouver Island.

SUNSHINE AND CLOUDINESS.

The distribution of sunshine is graphically shown on Chart VII, and the numerical values of average daylight cloudiness, both for individual stations and by geographical districts, appear in Table I.

The averages for the various districts, with departures from the normal, are shown in the table below:

Average cloudiness and departures from the normal.

Districts.	Average.	Departure from the normal.	Districts.	Average.	Departure from the normal.
New England	5.3	+ 0.2	Missouri Valley	5.5	+ 0.7
Middle Atlantic	5.0	− 0.0	Northern Slope	5.1	+ 0.3
South Atlantic	4.1	− 0.8	Middle Slope	4.9	+ 1.2
Florida Peninsula	5.4	− 0.1	Southern Slope	3.6	− 0.8
East Gulf	3.2	− 1.6	Southern Plateau	1.2	− 0.7
West Gulf	3.2	− 1.4	Middle Plateau	2.4	− 0.6
Ohio Valley and Tennessee	5.2	+ 0.2	Northern Plateau	4.5	− 0.6
Lower Lake	5.7	+ 0.8	North Pacific	5.6	− 0.5
Upper Lake	6.0	+ 0.8	Middle Pacific	1.7	− 1.5
North Dakota	5.4	+ 0.2	South Pacific	2.5	− 0.8
Upper Mississippi Valley	6.0	+ 1.0			

WIND.

The maximum wind velocity at each Weather Bureau station for a period of five minutes is given in Table I, which also gives the altitude of Weather Bureau anemometers above ground.

Following are the velocities of 50 miles and over per hour registered during the month:

Maximum wind velocities.

Stations.	Date.	Velocity.	Direction.	Stations.	Date.	Velocity.	Direction.
Abilene, Tex.	29	53	nw.	Pierre, S. Dak.	24	67	nw.
Bismarck, N. Dak.	1	52	se.	Point Reyes Light, Cal.	1	58	nw.
Buffalo, N. Y.	26	51	w.	Do.	3	62	nw.
Chattanooga, Tenn.	28	57	sw.	Do.	4	55	nw.
Cleveland, Ohio.	29	54	ne.	Do.	11	55	nw.
Knoxville, Tenn.	18	52	w.	Do.	12	68	nw.
Louisville, Ky.	15	58	nw.	Do.	13	64	nw.
Mount Tamalpais, Cal.	1	54	nw.	Do.	14	65	nw.
Do.	3	55	nw.	Do.	15	62	nw.
Do.	13	55	nw.	Do.	16	76	nw.
Do.	20	65	nw.	Do.	17	59	nw.
Do.	21	60	nw.	Do.	24	66	nw.
Do.	24	58	nw.	Do.	25	68	nw.
Do.	25	50	nw.	Do.	26	72	nw.
Do.	26	60	nw.	Do.	27	80	nw.
Do.	27	52	nw.	Do.	28	62	nw.
New York, N. Y.	8	72	nw.	Do.	29	50	nw.
Do.	13	60	nw.	St. Louis, Mo.	28	54	n.
Do.	26	52	nw.	Yankton, S. Dak.	25	64	nw.

ATMOSPHERIC ELECTRICITY.

Numerical statistics relative to auroras and thunderstorms are given in Table IV, which shows the number of stations from which meteorological reports were received, and the number of such stations reporting thunderstorms (T) and auroras (A) in each State and on each day of the month, respectively.

Thunderstorms.—Reports of 6,406 thunderstorms were received during the current month as against 6,670 in 1901 and 6,425 during the preceding month.

The dates on which the number of reports of thunderstorms for the whole country was most numerous were: 13th, 402; 7th, 351; 15th, 328; 3d, 316.

Reports were most numerous from: Missouri, 454; Ohio, 434; Illinois, 414; Iowa, 373.

Auroras.—The evenings on which bright moonlight must have interfered with observations of faint auroras are assumed to be the four preceding and following the date of full moon, viz: 16th to 24th.

In Canada: Thunderstorms were reported as follows: St. John, N. B., 2; Yarmouth, 17; Charlottetown, 2; Father Point, 16; Quebec, 2; Montreal, 24; Ottawa, 4; Kingston, 15; Toronto, 2, 12, 15, 24; Port Stanley, 2, 3, 11, 13, 15, 16, 23, 24, 25; Parry Sound, 2; Port Arthur, 2, 3, 9, 24; Winnipeg, 2, 11, 17; Minnedosa, 1, 9, 11, 19; Medicine Hat, 7, 10, 15, 16, 24; Swift Current, 1, 4, 10, 11, 30; Banff, 15, 29; Prince Albert, 22, 29.

No auroras were reported from Canada during June, 1902.

HUMIDITY.

The average by districts appear in the subjoined table:

Average relative humidity and departures from the normal.

Districts.	Average.	Departure from the normal.	Districts.	Average.	Departure from the normal.
	%			%	
New England	77	— 3	Missouri Valley	72	+ 3
Middle Atlantic	70	— 3	Northern Slope	63	+ 7
South Atlantic	75	— 3	Middle Slope	65	+ 6
Florida Peninsula	79	— 2	Southern Slope	58	— 2
East Gulf	65	—10	Southern Plateau	24	— 4
West Gulf	69	— 5	Middle Plateau	32	— 5
Ohio Valley and Tennessee	68	— 2	Northern Plateau	52	0
Lower Lake	74	+ 2	North Pacific	70	— 9
Upper Lake	74	+ 1	Middle Pacific	59	— 6
North Dakota	73	+ 5	South Pacific	65	+ 1
Upper Mississippi Valley	72	+ 1			

DESCRIPTION OF TABLES AND CHARTS.

By W. B. STOCKMAN, Forecast Official, in charge of Divison of Records and Meteorological Data.

Table I gives, for about 145 Weather Bureau stations making two observations daily and for about 25 others making only one observation, the data ordinarily needed for climatological studies, viz, the monthly mean pressure, the monthly means and extremes of temperature, the average conditions as to moisture, cloudiness, movement of the wind, and the departures from normals in the case of pressure, temperature, and precipitation, the total depth of snowfall, and the mean wet-bulb temperatures. The altitudes of the instruments above ground are also given.

Table II gives, for about 2,700 stations occupied by voluntary observers, the highest maximum and the lowest minimum temperatures, the mean temperature deduced from the average of all the daily maxima and minima, or other readings, as indicated by the numeral following the name of the station, the total monthly precipitation, and the total depth in inches of any snow that may have fallen. When the spaces in the snow column are left blank it indicates that no snow has fallen, but when it is possible that there may have been snow of which no record has been made, that fact is indicated by leaders, thus (. . . .).

Table III gives, for all stations that make observations at 8 a. m. and 8 p. m., the four component directions and the resultant directions based on these two observations only and without considering the velocity of the wind. The total movement for the whole month, as read from the dial of the Robinson anemometer, is given for each station in Table I. By adding the four components for the stations comprised in any geograpical division the average resultant direction for that division can be obtained.

Table IV gives the total number of stations in each State from which meteorological reports of any kind have been received, and the number of such stations reporting thunderstorms (T) and auroras (A) on each day of the current month.

Table V gives a record of rains whose intensity at some period of the storm's continuance equaled or exceeded the following rates:

Duration, minutes	5	10	15	20	25	30	35	40	45	50	60	80	100	120
Rates per hour (ins.)	3.00	1.80	1.40	1.20	1.08	1.00	0.94	0.90	0.86	0.84	0.75	0.60	0.54	0.50

In the northern part of the United States, especially in the colder months of the year, rains of the intensities shown in the above table seldom occur. In all cases where no storm of sufficient intensity to entitle it to a place in the full table has occurred, the greatest rainfall of any single storm has been given, also the greatest hourly fall during that storm.

Table VI gives, for about 30 stations furnished by the Canadian Meteorological Service, Prof. R. F. Stupart, director, the means of pressure and temperature, total precipitation and depth of snowfall, and the respective departures from normal values, except in the case of snowfall.

Table VII gives the heights of rivers referred to zeros of gages.

NOTES EXPLANATORY OF THE CHARTS.

Chart I, tracks of centers of high areas, and Chart II, tracks of centers of low areas, are constructed in the same way. The roman numerals show number and chronological order of highs (Chart I) and lows (Chart II). The figures within the circles show the days of the month; the letters *a* and *p* indicate, respectively, the 8 a. m. and 8 p. m., seventy-fifth meridian time, observations. Within each circle is also given (Chart I) the highest barometric reading and (Chart II) the